Calculation and Rounding Rules

These calculating and rounding rules are the department's accepted standards of LA DOTD. They shall be used to perform all testing procedures calculations, including DOTD, AASHTO, ASTM, Federal Test Methods, Corps of Engineers, etc. Exceptions, if any, will be determined by the DOTD Materials Engineer Administrator.

Examples of all calculations, along with any deviations, are given in each DOTD testing procedure.

When performing calculations there are two actions to consider - truncating and rounding. Truncating is the act of discarding any decimals beyond those needed. Rounding is the act of bringing the value to the nearest significant figure. Intermediate calculations are truncated; intermediate steps and final answers are rounded. An intermediate calculation is any math function within a formula. (e.g., (A x B)/C - A x B is an intermediate calculation whose result is truncated and then divided by C.) An intermediate step is that value which is carried forward into another calculation. An intermediate step is noted on a worksheet and may or may not be reported. A final answer is that result which is reported.

Intermediate calculations are truncated as follows:

1. If the final result of the formula is not a percentage, then truncate 2 decimal places beyond the required accuracy of the final answer. (e.g., The final result is to the nearest 0.01 sq yd - truncate after the fourth decimal place or 0.0001.)

2. If the final result is a percentage, then truncate 4 decimal places beyond the required accuracy of the final answer. (e.g., The final result is to the nearest 0.1 % - truncate after the fifth decimal place or 0.00001.)

The final result of the formula is then rounded to the desired accuracy. This rounded value will then be used in any subsequent calculations, noted on a worksheet and/or reported.

The final answer shall be carried 2 decimal places beyond the required degree of accuracy before rounding. Rounding will be performed as follows:

1. If the 2 digits following the point of desired accuracy is <u>less than 50</u>, do not change the digit to be used.
   Example: 2.38 = 2
   2.049 = 2.0
   2.1339 = 2.13

2. If the two digits following the point of desired accuracy is <u>more than 50</u>, add 1 to the last digit used.
   Example: 2.51 = 3
   2.062 = 2.1
   2.1359 = 2.14

3. If the two digits following the point of desired accuracy is <u>50, and</u> the last digit to be used is <u>even</u>, do not change the last digit used.
   Example: 2.50 = 2
   2.650 = 2.6
   2.2450 = 2.24

4. If the two digits following the point of desired accuracy is 50, and the last digit to be used is odd, add 1 to the last digit to be used.

Example: 3.50 = 4
3.750 = 3.8
3.4550 = 3.46

Always follow the example calculations given in the DOTD testing procedure. However, if there are no calculations shown, or if working a non-DOTD procedure, consult these rules.

NOTE 1

Most electronic calculators automatically carry several decimal places beyond the point of desired accuracy. The degree of accuracy obtained is different than that achieved through application of the standard rules. The user is cautioned that the use of an electronic calculator without the application of standard rounding and calculating rules may cause variations in final results and subsequent violation of the calculating and rounding rules. This possibility can be avoided by manual truncation and reentry in accordance with the standard rules.

NOTE 2

When methods shown in a test procedure or approved software deviate from the standard calculating and rounding rules, the standard rules are not to be used. The specific methods shown in the procedure or the approved software are to be used for calculating and rounding purposes.